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OUT OF DOOR WORK IN GEOGRAPHY*

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EARTH IN REALITY A BALL; IN BOOKS AN OBLATE SPHEROID

WHAT is the shape of the earth? You will tell me that it is an oblate spheroid in a mixture of Latin and Greek that betrays the mediaeval source of the statement, yet it is known to be nothing of the sort. The ancient Greeks wrote the earth down a sphere. Observing by the stars that its surface was curved, they assumed with charming simplicity that it must be spherical, since the sphere is the only perfect solid with curved surface. All of their measurements were made in the tiny patch of the earth's surface between Asia Minor and Greece in one direction, and between the Balkans and the first cataract of the Nile in the other. When the telescope was invented better measures on the stars showed men that the earth was not a sphere. Isolated measurements now made in small portions of Ecuador, France and Lapland were supposed to authorize the statement that the earth was the oblate spheroid of the books, with elliptical meridians and parallels circular, still a large conclusion based on a small foundation of fact. As larger portions of the earth's surface were included in the area studied, it appeared that the parallels were not circles but only more nearly circular than the meridians were. Further study only reveals further irregularities until Geodesy is tempted to rest on the description of our planet as a geoid, which means in plain English earth shaped. There is no purpose other than having a learned air which is not satisfied by calling it a ball. A six-inch globe, modelled exactly in the proportionate shape of the earth would be only a fiftieth of an inch shorter from pole to pole than from side to side on the equator. The eye could not detect any defect from sphericity, for the other deviations from a spherical form are of still less magnitude. A

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body that appears to the eye to be a sphere but is not probably of perfect sphericity is what men mean by a ball. I cannot see any possible educational interest in the earth's polar flattening until the high school course in physics is reached, or higher courses in astronomy and geodesy. The very roundness of the earth is with most men a matter of faith, only it is not frankly treated as such. Those scientific men, the geodesists and astronomers, who tell us what we know of its shape, have learned it by measuring the difference of direction of the stars from different parts of the earth's surface, essentially as the Greeks learned its roundness twenty-three centuries ago. The so-called argument from the appearance of a ship as it sailed away from land was not invented for more than three centuries and is another illustration of the habitual substitution of words for things or thoughts. Have you ever watched ships in the distance? You will find it much less clear in fact than in the book. In the first place a very clear day is needed to give good seeing down to the horizon. Even then the horizon is so far that unless you are provided with a glass it is difficult to make out more than that very little of the ship is visible anyway. I am convinced that not one per cent. of those who teach this "reason for believing the earth to be round" have ever even tried to see it for themselves. I am confirmed in this belief by the fact that the argument is given in the same form in the region of the Great Lakes where masts are now a rarity, and a single day's experience will satisfy anyone that the last part of a vessel visible is the smoke. To-day we shall simply teach children that the earth is a ball. When they suggest that it does not seem so, we shall state that it is because we see so little of it at once, and we will invite them to examine the portion of a globe visible through a hole in a card small enough to let them see no more of its surface than we can see of the earth when we look upon it even from an elevated position. We shall no longer offer explanations that we have not ourselves tried, but as children take more easily to illustrations than to explanations, for a considerable part of their schooling they will use the globe for their only map.

WHEN WE GET CHILDREN TO NOTICE WE TEACH ELEMENTARY SCIENCE

It is felt that the elements of all the sciences are to be taught in the early part of geography, but I think there is little clearness in the public mind as to what constitutes the elements of a science. My notion is that we should not have little books about things, but a little contact with things in the way of illustration. Our elements of astronomy are too often words stating the results of the astronomer's work and the explanation of things the pupil has never noticed. It is supposed that observations may not be

attempted because they are so difficult or the instruments are so expensive. I think it would be more rational to leave out the book with figures for size and distance of the planets and look at the real stars and planets some, just with our unaided eyes as the Greeks had to do. Instead of treating children to a diagram and explanation of the cause of the seasons, I would direct their attention more to the actual facts of the seasons; have them note the varying height of the sun in the sky, the varying length of the day. It is logical to have the high sun and the long day firmly associated with the heat of summer before we attempt to point out the causal nature of the association. Such a procedure always enters into the suggestions of the trained astronomer or geographer, but the practice is still too little known. In chemistry and physics we are now faring better and in botany and zoology, the books, it is understood, are not open to the beginner until they are illustrated by the things. Observation is not to be done at second hand and the school books in those sciences of the last generation are relegated to the waste heap for having attempted to enlighten us by relating what would have happened had we made an experiment. Nature study in the school is an evidence that we are trying to do well by children in this direction as far as we understand it. Agassiz is supposed to have transformed the more mature teaching of natural science in this country in the same matter of directing attention first to the facts before attempting to examine relations. Concrete geometry in the grades is in the same line and is widely urged.

THE THEORY OF LABORATORY WORK

It is the question of the laboratory method. In general the progress of human knowledge has been by observation and record and discussion of observations, these being either tentative to see what will happen, or in the nature of verifications of what the mind expects. Progress is enormously facilitated by the records of past work accumulated in books, enabling each investigator to stand as it were on the shoulders of his predecessors, but further progress is possible only by further observation, and past progress is intelligible only in the light of the observations on which it was founded. This is the part laboratory methods should play in education. The concepts that the race have acquired by observation must be acquired by the individual in the same way. It is true alert-minded individuals come along now and then who have done some observing for themselves. They bring to class the basal concepts that we must build up in others by laboratory methods. Such people are ready to use books, to set *them* observing is to infringe on their personal liberty. When the basal concepts sought have been

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established the laboratory work has accomplished its end. Mere telling can never establish these concepts. No process of development can elicit them unless a concept nearly like them already exists in the mind. Education suffered generally from this defect through the sixteenth, seventeenth and eighteenth centuries. Words were habitually put in place of ideas. The rise to ascendency of science in the nineteenth century was effected by men who rebelled at this domination of the printed word, just as they rebelled at the domination of unfit rulers by divine right. My plea, the plea of all who are interested in geography to-day is that geography, like physics and chemistry, may break away from the dominion of the mere word and start with the basal concepts given by observation. You all know Horace Mann's story of the children who answered with admirable precision and promptness all the questions put to them about the natural divisions of the earth, oceans, continents, gulfs and islands, but when asked by a visitor if they had seen this earth they were reciting about replied in good faith and unanimously that they never had. The earth itself is all about us, Cape Horn or the Rocky Mountains are not more essential parts of it than the region about our house. Let us not have a little book of home geography to start our pupils with, but let us take them out to make acquaintance with the near parts of the world for themselves. Imagine a course in music with no sounds in it! Imagine the children to have all the melodies described to them as things that would be beautiful if they heard them sung but never to hear them! To be taught to read the music and appreciate it by imagining the sound of each note as it came before the eye! Do you think they would care much for music or stay long in school to study it? Yet what is this but the method that is employed in geography? Distant lands are described in terms that are only made known to the class in description. Pages of lessons are assigned and hours of classes pass that are unillumined by any gleam of apprehension. Teachers themselves too often have no associations out of the book with the matter of the lesson. Recall to mind the knowledge the ancient Greeks had of astronomy and compare it with the pitiful thing called by that name in American high schools to-day, despite the tremendous advances that have been made in the science since that time. The Greek class in astronomy studied the stars, the modern class studies a book about the stars. Who knows to-day the planets as they wheel in their courses? We know that there are observatories with powerful telescopes where astronomers can make out wonderful things about them, so we make out none of the wonderful things our unaided eyes will let us see. It is the experience of chemistry and physics over again. A little while ago we read about the experiments in a book without

ever trying them; to-day laboratories have been put in every school. One of my school-masters was a specialist in mineralogy. When I read of the ledges that the glaciers had smoothed and polished, I asked him if the smooth and polished ledges of my home neighborhood were of this origin. He answered that those were things that were only found in Canada! Years later I went to that home of my boyhood to find a splendid glaciated ledge in my father's cellar. The laboratory of geography is all out of doors. Why not visit it? For geography this is to give the concept of the elements of land-form that make up the actual earth and the meaning of their symbolic representation in maps.

DON'T READ ABOUT LAND FORMS, GO AND SEE THEM

Much of the difficulty of modern physiography lies in the reader's ignorance of the units of land-forms as realities, though many of them are abundant and easily recognized by a child. Rivers have been regarded as water flowing down hill mostly toward seas or lakes. Here is the handicap of my subject. If you have not gone out to examine rivers, real rivers in the real world of out of doors, how can I hope to win you to see what a river is like by merely telling about it? I should like and I ought to go out on the bank of a river with you and seek there to guide your attention. Everyone has seen rivers, it may be answered, all have looked at them and know how they behave. They have seen that as they have gone about the world on their own affairs. But it is not thus that nature is questioned. This river of the definition has smoothly drawn parallel banks between which the water flows steadily onward toward the sea. But the first river we come to has no such parallel banks: it is a succession of pools and rapids. It is not curious in this; it is not flowing over harder and softer rocks; it happens to flow over masses of homogeneous clay. In the pools the water is circulating slowly, always in part against the general course of the stream. Here the width is five or six times as great as in the narrows. The depth varies as much. Some of the water that has plunged into the pools rises again at the further border to escape down the next rapid. Not a small part of the water in our river at any moment is actually ascending. In a half mile walk the other day by the bank of a river I found the bank bathed for a third of that distance by water flowing upstream. These things that I have mentioned are not exceptional details. Go out to-morrow and look at the first stream that you encounter. It will certainly show you many or all of these features that I have pointed out. You cannot find the stream with parallel banks and water descending steadily toward the sea. Again it is a good chance you find the water muddy. If you could examine the stream

bottom you would certainly find gravel, sand or silt traveling along all the time. How common those color names for the world's rivers: Blue Nile, Red River, Yellow River, Black River, Colorado River, River Rouge, Kara Su and Kizil Su, Rio Negro and the Niger. As for the stuff that travels along on the bottom note the sand and gravel sheets left on grassy flats beside the river when the floods of spring have subsided. Sometimes the river seems clear, but the nearest to a stream of water only that I know of is reported in the Upper Peninsula of Michigan and contains only traces of chlorine! There is good ground to regard the material other than water which the water bears along in one way or another as perhaps more significant than the water itself. The river is always in a valley; in the lower parts of that valley are always found deposits of the material excavated from that valley. They have come down in the stream. They constitute the soil on which dense populations of men live, but they are the gift of the rivers to men like the valley itself, the only inhabited part of the mountains. The broad valleys and picturesque gorges of Switzerland are no less the gift of sediment laden streams than are the plains of Belgium, Holland, North Germany, Hungary and Lombardy, spread out for the densest populations of Europe by the same rivers that won the sediment from the massive Alps. Men rarely live far from some running stream. A little river is better for class study than the Mississippi. The study of rivers is a very modern thing, what we know of them is still but little in proportion to the number of problems they present to us. But many bold features that characterize them and fix their great significance to men are easily illustrated in their presence.

CHILDREN WILL LIKE TO RECOGNIZE EARTH-FORMS

It may be in order here to put in a word of caution. I am not contending for more advanced work in elementary grades save only in the sense that much that is done there is mere dawdling and waste of time. I am ignorant in this matter of stages of developing mind, not absolutely ignorant, I have five children, but relatively. I should like to believe, however, what I am told that the high school age of the middle teens is the time to reason, the earliest fit-for-geometry age, and that it is preceded by a stage when it is better rather to attract the attention and drill the memory. This is the period in which most of the work in geography is to be done short of the high school or college courses in physiography. I understand further from President Hall that in the very earliest years, along in the first, second and third grades perhaps, mere showing, without putting a strain on the attention or memory is more in order. I would definitely try then to interest in the

earliest years and never seek more than an emphasized association in the later years. I believe that children know nothing more interesting than the world of out of doors and this interest I would utilize. They tell me that children's first interest is in living things, for which reason geography is little adapted for nature work with the little ones. I find here, however, the best reason why geography is so admirably fitted to their needs: it is so very much alive if you take it in its out of door aspects and not its book forms, which are dead enough. I know a Massachusetts city of forty thousand people where, in my mind's eye I see a class of thirteen and fourteen year-olds dig away for an hour at a delta disclosed by the temporary draining of a mill pond, changing the course of the inlet stream by simply damming it and delightedly watching it cut little canyons and build new cones of detritus at its emergence. They did not seem to think the thing dead. I do not think their little brothers and sisters would have lacked interest. I am sure their minds would not have been strained.

GEOGRAPHY IS PROPERLY CONCERNED WITH THE ACTUAL FEATURES OF THE EARTH

Here my friend the geologist steps in and reminds me that really you know, all that is very interesting, but it belongs to geology rather than to geography, just as my friend the botanist will protest if I stop with my class to look at the grouping of some plants, pure plant geography of course. This is a realm of nature the botanists like so well in these days that they want to fence it off for theirs under the name of plant ecology. The fact is that geography is so uninteresting by nature in the opinion of some incompetent judges that any interesting thing should be at once transferred to some other realm of knowledge. I am not much disturbed by these protests of invasion. The delimitation of geography from other sciences is too difficult for a mere geographer. I must leave that for a school superintendent or a professor of psychology. Meanwhile, the world being made of a great variety of things little and big, far and near, I propose to use the little and near ones to give my student basal concepts for the great and far.

MAPS SHOULD BE SYMBOLIC OF THE REAL WORLD

For that is what it must come to presently. When we have grown intimate with our home river in drought and flood, in summer and winter, let us use it to build up concepts of Nile and Amazon. Most of the facts of distant places we must learn from maps. Here are other basal concepts to be got ready. Why is it so many of my students tell me that they are permanently turned round? That they have fixed notions about the north

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that do not accord with the behavior of the sun and will not for all they may do? I asked one of them how it came about and she said she thought it came from too much study of the map. I think it comes of too much map as mere map and too little recognition of the map as a symbol of actual regions. If the map of the home locality had been studied and used as the class went about the country itself, if they went about the country with compass in hand, and a compass is as much needed in a school as a dictionary; if they used that map and that compass however little, to locate and find the things they were interested in, be it the flowers, the birds' nests, the nut trees, the fishing and swimming places, the skating places or the other things dear to a boy's heart and good for a teacher to know about if she would only learn, the north would settle down into its place without more ado, and when the map of South America or Australia had to be brought out, those rolls would not *be* South America and Australia as they are too often to-day, but symbols distinctly aiding vivid conceptions of those distant lands. We Americans are not making what we might of maps. Some of the national departments at Washington are making beautiful ones, notably the Coast Survey and the Geological Survey. They are cheap too, cheaper than any other good maps made anywhere, but they are not much used by teachers, in part because they are not effectively advertised.

NOT LESS WORK IN GEOGRAPHY BUT BETTER WORK

President Hall would have us cut down the time given to geography to a fourth or an eighth of the present amount. These quantities differ enough to suggest that they are rhetorical and not to be taken seriously. If a fourth is the proper amount or even near it, an eighth would seem too little. If an eighth is about right a fourth is clearly excessive. Such a prescription can hardly come from a careful physician or one who has fully diagnosed the case. The sub-committee on geography of the Committee of Ten, including Americans distinguished for their geographical attainments the world over, admitted that the results now attained are not proportionate to the time they cost. They suggested observational geography from the start and went into valuable details in describing what they meant. They emphasized above all the need of teaching more geography to the teachers. There is a sense in which the teachers of geography to-day know less geography than the teachers of many years ago, and this is not wholly to be regretted, yet unaided forgetting is not satisfactory progress. The Committee urged in 1893 that an elementary course in physical geography be put in the last year of the grammar school, while physiography should be taught in the last year of the high school as soon as properly trained teachers

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could be obtained. This physiography I take it would differ from physical geography by using the strict logical arguments of geometry, physics and chemistry in the treatment of causes and effects. While such teachers could not be obtained a course in geology might take its place. Either of these courses to be given as advanced work with field work and laboratory work. They declared that without such courses as these "a serious danger threatens the whole line of geographic study in the schools, for the great mass of teachers of geography have not taken courses beyond the high school —and if they are not taught the elementary processes and principles of these sciences there, they will have little strength as teachers of gography. They cannot go much beyond mere facts and formalities." The committee thought in this way to utilize the time given to geography. This programme has been in print now for ten years. What has been accomplished? A year ago I made an investigation into the status of geography in the high schools of Michigan. While that state may not accurately reproduce the conditions of the country at large, it may fairly be called a representative state. One hundred and twenty-nine of the largest high schools of the state reported and the general conclusion I draw is that not a dozen schools in that great state are doing what was advised. The last year in the high school has physiography in but two schools and geology in only six. Only a third of the schools reporting did any out of door work and a quarter of them any laboratory work. Add to this that physical geography is not generally taught in our grammar schools and we have the net result that the course in physiography or geology is simply omitted and the grammar school physical geography pushed up into the first year of the high school. The mass of the teachers are still receiving no preparation for good work in geography. The Committee of Fifteen expressed its satisfaction with geography as of great educational value and made it a liberal time allowance in the suggestive programme it prepared. Sixty minutes a week of this time was allotted in the lowest two grades of school for oral lessons. If this weekly hour were given mostly to out of door work in the open weather of spring and fall, the best possible foundation could be given for later instruction on the regions of the earth. But it cannot be hoped to get the class ahead of the teacher. The teacher must be got out of doors first and taught to see. She will find there health and renewed strength for her daily task and a source of delight in the world about that she has never before suspected.

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PHYSIOGRAPHIC CONTROL OF THE CHATTANOOGA CAMPAIGN*

BY FREDERICK V. EMERSON

AT the opening of the civil war, the leaders of both sides clearly recognized three regions around which important campaigns must center. The confederacy was at a disadvantage in having no marked natural boundaries. The rivers and mountain led *into* rather than *around it*. The territory of the seceding states was roughly divided into three physiographic sections, each of which required a separate force. East of the Appalachians were the Piedmont and Coastal Plain regions, the struggle for which centered in the vicinity of Richmond. On the west was the Mississippi Valley, the "gateway to the confederacy."

The middle section included the rugged portions of Kentucky and Tennessee. By a singular combination of surface features the key to all this area lay in the comparatively small region in the vicinity of Chattanooga. It is the purpose of this paper to trace the relations between the campaigns centering about Chattanooga to the topography of the region—their "earth control," as the geographers would say.

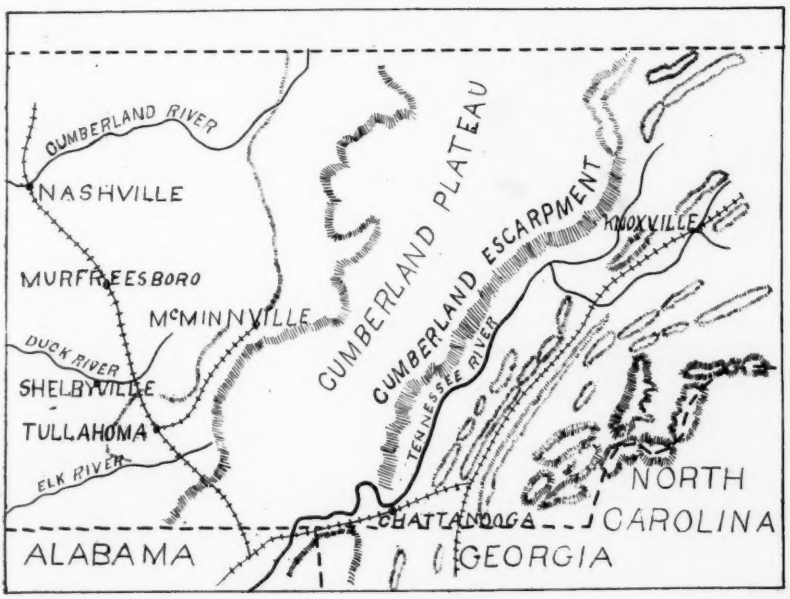
"Chattanooga," says Fiske, "was the northern gateway to the center of the confederacy. From it radiated railroads to the Ohio, Mississippi, Gulf and Atlantic; through it were the railroad connections of Virginia with the southwest. Its possession by the federal army would isolate Virginia and North Carolina from the western states of the confederacy, and open a way through Georgia to Atlanta and thence to the coast." On the other hand, its control by the confederates gave them the fertile valleys of east Tennessee and allowed them to threaten Kentucky and western Tennessee. They could readily move troops and supplies between the army in Virginia and the forces in the west. The mountaineers in Kentucky and Tennessee were largely unionists and this provided an additional strong incentive for the federals to control the region.

The importance of Chattanooga during the war and the cause of its industrial development since are largely due to physiographic and geological influences. Within a space of a few miles three different geological structures, each having a characteristic physiographic development, approach each other.

Taking these regions in order, the first to the eastward is the Appalachian. It is an apparent jumble of peaks, ranges and valleys, as a glance

*Reprinted by permission from the Popular Science Monthly, June, 1904.

at the relief map will show. Their ancient crystalline rocks have weathered with comparative slowness, and consequently the mass stands out in strong relief, extending nearly to the Atlantic and most effectively separating the southern Atlantic seaboard from the interior. So effective a barrier were they that communication from the coastal plain with northern Georgia, Tennessee and Kentucky was either by the passes in Virginia or around the southern end of the mountains by way of Atlanta. Prior to 1880 there was no railroad across these mountains south of Roanoke. Some of the



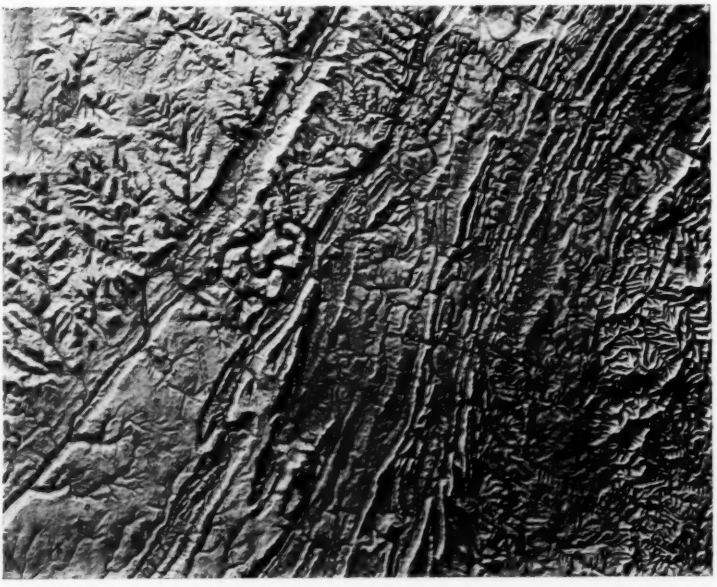
Outline Map of the Region included in the Chattanooga Campaign

intermontane valleys are fertile and support a considerable population, but the general inaccessibility of the region is shown by the life and customs of the people, which have scarcely changed since Revolutionary times.

In the tilting and folding incident to the formation of the Appalachian system, there was exposed a belt of limestones and shales extending in a direction roughly parallel to the mountain axis. These rocks are tilted and their upturned edges are easily eroded as compared with those on either side. The result of this erosion is an irregular trough from ten to seventy-five miles wide and over a thousand miles long. It is known in general as the

"Great" or Appalachian valley, but has various local names. In New Jersey it is known as the Kittatinny valley; in Pennsylvania it is the Cumberland valley; in Virginia it becomes the Shenandoah valley and in this region, the Tennessee valley or the East Tennessee valley.

The rocks are much inclined and their parallel edges of different degrees of resistance are exposed to the process of denudation, the results of which are long, narrow, parallel ridges running lengthwise along the valley. For example, the famous Chickamauga Ridge is composed of a compact resistant



Relief Map of the Chattanooga District. (Photographed from the model by E. E. Howell.)

rock, known as Knox dolomite, which stands above the valley floor because the neighboring strata are less resistant to the levelling effects of denudation. The traveler going through the region is not likely to recognize the valley form, as most of the roads are in smaller valleys between the ridges, but once gain some commanding elevation and the great valley is seen stretching away, its ridges and hills melting into insignificance on its apparently level bottom. The decomposed rock makes a fertile soil which early attracted settlers. From New York to Alabama it is the abode of a prosperous people with well tilled farms and comfortable homes.

Extending westward from the valley is a plateau region which merges on the north and west into the Mississippi valley and is known as the Cumberland Plateau. The geologist finds no difficulty in accounting for the transition from valley to plateau when the rock arrangement is seen. Here instead of the highly tilted strata of the valley, the rock layers are nearly horizontal. Instead of the troughs and ridges of the valley, the surface, while rough, has an even sky line which tells of a former approximately level

General view showing one of the Appalachian Valley Ridges in Monroe County, Tenn.
(Photographed by the U. S. Bureau of Forestry.)

surface. The elevations are steep and the streams seem to have no regular arrangement—in short, this region is a "dissected" plateau. The surface stratum of rock in general is a sandstone which is underlaid by a stratum of more easily soluble limestone. When a stream has cut through the sandstone layer and reaches the limestone, it deepens its valley more rapidly than before and consequently flows in a steep trench.

The overlying sandstone protects the limestone beneath and prevents

its active weathering, thus the rate of recession of a cliff is entirely regulated by the recession of the overcapping stratum. The general result upon the topography is high, cliff-like valley walls, and rather level-topped hills with steep slopes. Where the plateau meets the Great Valley, this is shown on a grand scale. From Chattanooga northeastward along Walden's ridge for scores of miles stretches a cliff or escarpment which overlooks the valley. It is steep and the streams flowing across the escarpment have gashed it into a serrate profile which gives it the local name of Cumberland Mountain. The lack of roads and general inaccessibility of plateau and escarpment made it a factor to be reckoned with in the movement of armies. The plateau is heavily timbered and, in contrast with the valley, is difficult of access and sparsely settled. The relief map of the Chattanooga district shows the surface appearance of these divisions.

The drainage of these regions is as peculiar and characteristic as are the surface features. The great valley is a structural valley, and not, as are most valleys, the seat of a great river. Its existence, as has before been noted, is due not to river activity, but to the easy denudation of its rocks as compared with those on either side. The only large rivers flowing lengthwise of the valley are the Shenandoah and Tennessee. These and the smaller streams have a general direction parallel to the valley trend. They have discovered strata which they can erode and into which they have sunk their channels. The streams on the plateau have no such succeeding parallel strata to guide their course and have cut valleys in an irregular fashion, not unlike the branching of a tree.

Looking at the course of the Tennessee, it would seem that the river could hardly have taken a more roundabout way to the sea. Rising about seventy miles above Chattanooga, it follows the valley trend until it reaches this place. There, instead of continuing about three hundred miles down the valley to the Gulf, the river turns abruptly to the westward and enters the plateau by a deep gorge. Flowing in a meandering course, it passes through northern Alabama and across Tennessee and Kentucky, entering the Ohio River at Paducah, over fifty miles north of its source. It finally reaches the Gulf after a circuitous journey of more than three times the distance that would be required had it taken the course down the valley. Indeed, some geologists hold that the Tennessee at one time did follow the shorter course, but a tilting of the land together with the rapid erosion eastward of a westward-flowing stream diverted the river to its present course.

The civil war opened with the Chattanooga region in the hands of the confederates who also controlled Tennessee and Kentucky to the north and west. Both sides were fully alive to the importance of the position and for

over two years it was the objective of the union armies. But at this time Chattanooga was nearly one hundred miles within the confederate lines, which reached from Columbus, a strongly fortified post on the Mississippi, to Cumberland Gap, at the northeast corner of Tennessee, where there was a pass to the Great Valley. At about the center of the line were forts Donelson and Henry, which commanded respectively the Cumberland and Tennesee rivers. These rivers were natural roadways into the confederacy, and it was an important step when Grant captured the forts. The first

View in the dissected Cumberland Plateau, near Sewanee, Tenn. The Mountains, are formed by denudation, leaving an even sky-line. (Photographed by the U. S. Bureau of Forestry.)

advance toward Chattanooga had been taken, and from now on until its capture Chattanooga was the goal of some Union army in Tennessee.

General Rosecrans was in command of the army which found itself ready to start for Chattanooga, with General Bragg as his opponent. Bragg had attempted an invasion of Kentucky, but was checked at the battle of Stone River, near Murfreesboro, which left the two armies facing each other on the Cumberland plateau. Rosecrans's army and supplies were concentrated at Murfreesboro and Bragg had his center resting at Tullahoma,

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a straggling village important only as a railroad junction. The Tullahoma campaign which now followed was indecisive, but is interesting to the student of military history because of the strategy by which Rosecrans forced his adversary to retreat without incurring serious loss to the federal army. Its consideration is also appropriate in this article, since the plans of the commanders and the movements of their forces were very largely controlled by the physiography of the plateau.

So deeply dissected is this plateau that, without exception, military writers speak of it as the Cumberland "Mountains." Weathering and stream work, continued through untold ages, have cut deep valleys and carved hills until we have the present rough country to cross which, even without an enemy in front, was no small undertaking. The soil, derived from carboniferous sandstone in general is a thin sandy loam, and only in the valley bottoms where the streams have worn a trench and partly filled it with alluvial sediment is the soil fairly fertile.

The plateau with its overlying sandstone is believed once to have extended across middle Tennessee, but active erosion in the vicinity of the larger rivers has removed all but a few remnants of the sandstone and left the underlying limestone to form the floor of the middle Tennessee basin. The Cumberland Plateau is therefore a surviving portion of this old extensive plateau. It is commonly known as the Highland Rim.

The plateau descends towards the plains of middle Tennessee by three great irregular terraces each roughly about five hundred feet high. Through these terraces streams have carved narrow valleys through which the roads pass to the lowlands. These gorges, called "gaps" by the mountaineers, were as important to the armies in that section as were the "wind gaps" between Virginia and the Shenandoah valley to the confederates. They were easy to hold with a small force against a numerous body of the enemy and were especially serviceable to a retreating army, since a small rear guard was able to give complete protection.

The question of railroad transportation was an almost paramount one in these campaigns and, as we have seen, was one of the reasons for the military importance of Chattanooga. The modern army with its concentration of men and horses is rarely able to live on the country through which it passes, especially if it is on an offensive campaign and traversing territory through which the enemy has passed. To do so would involve the spreading of the troops over a large area or detaching a considerable force to forage. Sherman's famous march to the sea was a successful instance of a large army living on the country, but he had no active enemy in his front and was passing through the "garden of the confederacy." If a railroad or river is

not available for transporting supplies, resort must be had to wagon trains.

The average army wagon was drawn by six mules and carried a day's rations for five hundred men. If the distance were such that the wagon could not make a complete trip in one day, more wagons were required. It was even harder to provide food for the horses. When cattle could be driven it would give some relief to the wagon trains. To give a general idea of the magnitude of this work, it is estimated that it required one thou-

The Region about Tullahoma.

sand wagons and six thousand horses to feed an army of fifty thousand men when they left the railroad or base of supplies for a distance of two days' march. This estimate assumes good roads and no breakdowns or stoppages by the enemy and does not include transporting the sick and wounded or the ammunition and materials of war.

The Louisville and Nashville railroad winds through the plateau following the valleys which the streams have cut. It crosses many streams and deep gorges by wooden bridges which were easy to destroy and difficult to

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rebuild. Both armies were dependent on this road for their supplies. About Tullahoma the soil, before it was cleared, supported a growth of pines and from the general inhospitality of the region was known as the "Pine Barrens." The soil drainage was so easy that in a dry summer there was scarcity of water on the uplands, but in a rain, as one of the federal officers complains, "The soil became as quicksand after a rain, allowing artillery and wagons to sink to the hub." Thus the dependence of the two armies upon the same line of railroad was almost absolute.

The Tennessee breaking by a Steep Gorge through the "Mountains." Owing to the swift current it is there called the "Suck."

After the battle of Murfreesboro, Bragg's policy was one of defense. His position was strong and well taken. His center and depot of supplies were at Tullahoma, where he had thrown up extensive intrenchments. His left was at Shelbyville on the plateau, about thirty miles to the northwest in the Duck River valley. This town was in a fairly fertile alluvial valley which offered some sustenance for the troops and horses and, further, was a center from which roads diverged in all directions. Moreover, if he were forced from his position, he could retreat to the plateau which could be fairly easily defended. To his right from Tullahoma, Bragg had posted bodies of troops for the double purpose of defense and of threatening the

Moccasin Bend from Lookout Mountain. Chattanooga is seen in the middle ground. The long even sky-line to the left is the plateau escarpment. The small plateau on which the battle of Lookout Mountain occurred is in the immediate foreground.

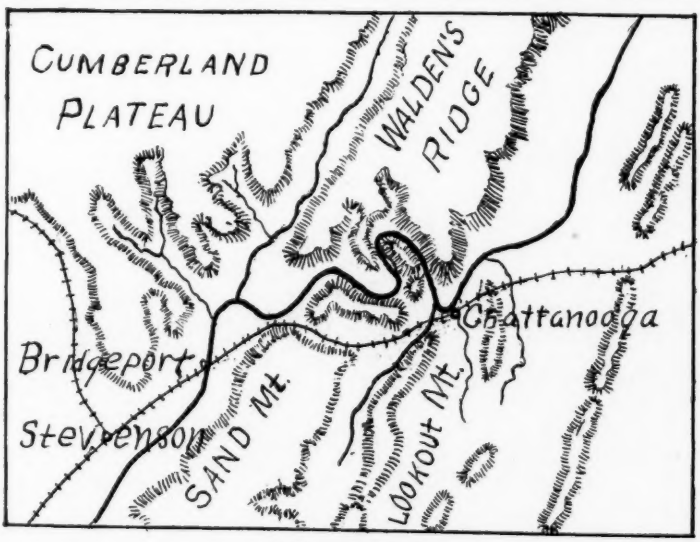
union base at Murfreesboro. His defensive positions were taken where streams passing from one terrace had cut gorges through which roads passed to the plateau, the most important being Hoover's Gap and Liberty Gap. Bragg believed that he had sufficient men in this vicinity to guard the narrow defiles through which most of the roads ran.

Without going into detailed accounts of movements of troops, Rosecrans's plan may be briefly stated. Realizing the strength of Bragg's left at Shelbyville, the Union general resolved to attempt what his opponent evidently considered well-nigh impossible—to get his forces on Bragg's right in such a position as to threaten the latter's line of communication and compel him to evacuate his strong position.

A strong Union force with several days' rations in wagons and *on hoof* was detached for this movement. A vigorous attack on Bragg's left partly concealed the plan of Rosecrans and prevented him from sending reinforcements from here. The movement was successful and the defiles or "gaps" were secured by which the troops could pass to the level of the plateau on which Tullahoma was situated. The confederate general, not waiting for his line of supplies to be destroyed, retired to the Tennessee, burning the bridges and destroying the railroad as he went. A pursuit was attempted which was entirely ineffectual. Again the narrow stream gorges were an important factor. The passage of the confederate army had left the roads almost impassable and their rear guard had little trouble in defending the defiles through which their columns had passed. Bragg crossed the Tennessee and leisurely led his army into Chattanooga.

At this stage the immediate topography of Chattanooga and its vicinity became important in determining the military movements. Looking at the relief map it will be seen that the city lies at the western side of the Great Valley close to where the river breaks into the plateau. It winds through Sand Mountain in a deep gorge which narrows in places, making the current so swift that an ordinary steamboat could not ascend without aid from teams or men on the shore. When the river reaches a long, narrow trough, called the Sequatchie valley, it takes this easier path and flows sixty miles before again crossing the plateau in its indirect course to the Ohio. Near the city the river flows to Lookout Mountain and then doubles on itself, flowing northwesterly, almost parallel to its course, for several miles. This is the famous Moccasin bend, so called, of course, from its rough resemblance to an Indian's moccasin. At the apex of the bend towers Lookout Mountain, the most conspicuous feature of the vicinity. Geologically it is a part of the plateau from which it is separated by a narrow erosion valley. It is capped by a sandstone stratum which slopes to the

south, where it finally merges into the general level in Alabama. Its bold profile against the sky at once attracts the eye, and the name is decidedly appropriate, since on a clear day several states can be seen from the summit. The ridge, for so it must be called instead of "mountain," rises in slopes so steep that they were insurmountable by an army, while its summit is fourteen hundred feet above the rapid current. A mile or so eastward is Missionary Ridge, roughly parallel to Lookout, but much lower and more accessible. Its top is really a succession of hills or knobs. Between these ridges is Chattanooga Creek, which enters the Tennessee near Chattanooga.

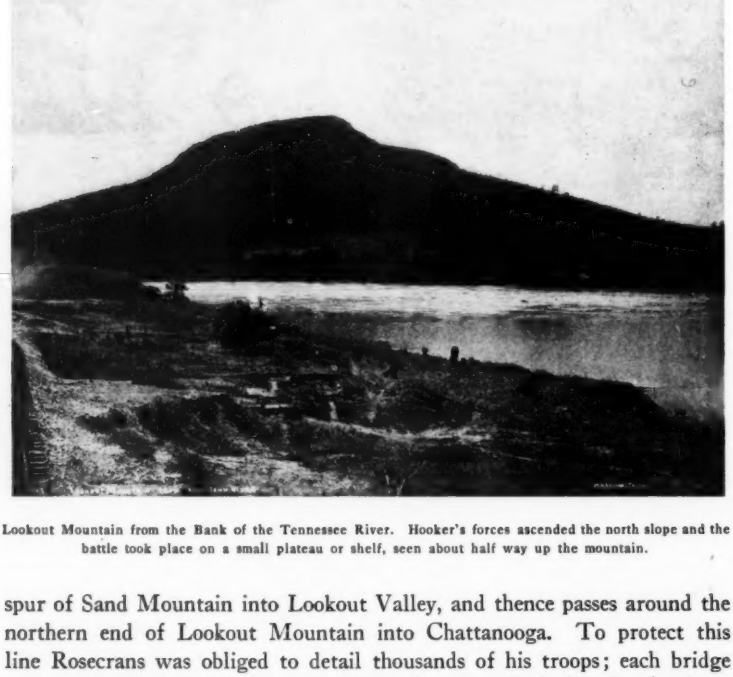


Vicinity of Chattanooga.

Still to the eastward of Missionary Ridge is the famous Chickamauga Creek. Looking westward from Lookout summit, the view is wild and picturesque in the extreme. Extending to the base of the mountain the valley of Lookout Creek is seen in the immediate foreground. Beyond that is the rough Sand Mountain, whose name tells the story of its rock structure and suggests its scraggly covering of trees and shrubs. To the northwest the river winds in its narrow gorge in the plateau for a few miles and disappears around Sand Mountain. North of the river Sand Mountain is continued and known as Walden's Ridge.

Returning to the military movements, we find Rosecrans on the Cumberland plateau, in the vicinity of McMinnville. For some time he was busy

repairing the seventy miles of railroad leading from Murfreesboro towards Chattanooga, which the conferedates had destroyed in their movement southward. Some of the bridges of this road were destroyed and rebuilt four times in the course of the war. The Chattanooga and Nashville railroad passed to Stevenson, a small town about thirty miles down the river from Chattanooga, where it joined the railroad leading from Chattanooga to Memphis on the Mississippi. Stevenson was the federal base of supplies. The road then crosses the river at Bridgeport, crosses through a ravine, a



Lookout Mountain from the Bank of the Tennessee River. Hooker's forces ascended the north slope and the battle took place on a small plateau or shelf, seen about half way up the mountain.

spur of Sand Mountain into Lookout Valley, and thence passes around the northern end of Lookout Mountain into Chattanooga. To protect this line Rosecrans was obliged to detail thousands of his troops; each bridge was guarded by a detachment of soldiers who generally had built a stockade in the vicinity. The country was swarming with detached bands of hostile "guerillas" who would wreck a train or burn a bridge and then escape.

The Union commander had open to him two approaches to Chattanooga. He could advance over Walden's Ridge directly upon the city, but this

route was beset with difficulties. The roads were very poor and led over the hilly, wooded plateau. After a rain they speedily became impassable to wagons. His base of supplies and nearest railroad point was at Stevenson, from which he would be compelled to haul supplies for the army in the presence of an enemy well supplied with cavalry; moreover, he would have to cross the river in boats at Chattanooga in the face of a vigilant foe. In spite of its difficulties this was the way which Rosecrans was generally expected to take, as it was thought that Burnside, who was near Knoxville, up the valley, would come down and join in the movement.

The other approach lay along the river valley and across Sand Mountain. The advantage of this route was that the army was near its base of supplies, with which it had both river and railroad connection. However, the roads were poor and the route lay across parallel ridges, almost inaccessible except in a few places. It would be hard to maintain a compact advance over the rough country, and a regiment of the enemy could easily delay an army. Rosecrans chose this route and the manner in which he maneuvered his army was certainly a brilliant piece of strategy.

Bragg had expected the federal army to come over Walden's Ridge, and Rosecrans did all in his power to strengthen that belief. Troops were deployed in front of Chattanooga and at night camp fires were lighted on the hills above the river. By feinting in this way Rosecrans was able to advance his army into Lookout Valley without encountering opposition. From here he went through the passes of Lookout Mountain into Chattanooga Valley and threatened Bragg's line of communication with the south. Bragg led his army out and, after a series of maneuvers, the battle of Chickamauga was fought with disastrous results to the federals. Had it not been for the stand made by Thomas, the "Rock of Chickamauga," the Union army would have been routed. As it was, they were driven into Chattanooga and imprisoned by a seemingly impregnable line of works. Lookout Mountain was abandoned and at once occupied by the confederates. It was apparently the key to the situation.

Rosecrans had caught the wolf by the ears. He had gained Chattanooga, but was a prisoner in its outworks. To advance against the strongly entrenched enemy was folly. To retreat across the plateau would have demoralized his army besides losing the position he had won at such cost. Worst of all, the enemy had taken possession of Lookout Mountain, which Rosecrans had felt obliged to abandon. They had fortified the position and placed guns which commanded the river and railroad west of Chattanooga, thus cutting off supplies from that direction. For awhile provisions came over the Cumberland plateau, but the hardships of the route soon exhausted

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the teams which could not follow the river, as that was patrolled by the enemy's pickets, and were obliged to take circuitous roads over the hills and away from the river. The cattle that were driven that way were hardly able to stand alone, much less furnish sustenance. The soldiers with grim humor spoke of them as "dried beef on the hoof." Bragg, confident of his game, sat down and waited for the Union army to be starved into surrendering, and his hopes did not seem unreasonable.

The north was thoroughly alarmed at this state of affairs and Grant was put in command. His first work was to open a line by which supplies could reach the city. The celerity with which he accomplished this makes one wonder why it was not done before. The only feasible route was up the river, but the works on Lookout Mountain controlled both the river and the railroad west of the town. Down the river and out of range of the guns on Lookout was Brown's ferry, which was guarded by a force of confederates. Hooker's division, which had been brought from the east, was thrown across the river and, capturing the force there, entrenched a position commanding the river, which was now clear below this point.

The famine in Chattanooga soon ended. Supplies came to Bridgeport, from thence to Brown's ferry, which Hooker was guarding, and then by wagon to the army. The soldiers were soon well fed and clothed by the "cracker route," as it was appropriately called.

Grant was now free to develop offensive plans. It will be remembered that Bragg's lines stretched from his left on Lookout Mountain to Missionary Ridge, where his right was strongly entrenched; Thomas was to threaten the confederate center, Sherman was to attack heavily on Missionary Ridge and Hooker was to move on Lookout Mountain and the enemy's left.

The latter's movement in the celebrated "battle above the clouds" was successful. However, since the establishment of the new line of supplies, Lookout had ceased to be the key to the position. Sherman found the opposing works stronger than he expected and he was not immediately successful. However, in the center the unexpected happened. This position was believed to be too strong to be carried by direct assault and the attack was intended to prevent reinforcements being sent against Sherman. The troops had orders to stop at the first rifle pits, but they could not be restrained. They rushed up the steep slope, carried the position and the confederate center was broken. Bragg was badly beaten and withdrew to Dalton. The region was not out of Union hands during the rest of the war.

Chattanooga's importance has not ceased with the close of the war. Its position at the gateway between the grain and cotton states, together with the resources of the surrounding country, makes the location of an important

city in this region almost inevitable. Since the war, the river has been made navigable most of the year to the Ohio. Railroads have multiplied and eleven lines enter the city. Iron, coal, limestone, cotton, lumber, grain are near at hand in the valley and plateau. The city's population and manufactories have doubled in a few years. The battlefields in the vicinity have been surveyed and mapped and the Chattanooga and Chickamauga parks rank with Gettysburg among the military parks of the world.

At a point near Chattanooga one can view the two aspects of the place without changing his position. In the beautiful national cemetery rest over twelve thousand veterans of '63. Turning a little, the city is in view. Its factories are a prophecy not only of the city, but as well of the New South.

COMMERCIAL JAPAN IN 1904

Japan and its relation to the territory bordering on the Pacific Ocean is the title of the map. Comparison of this with a good physical map of the Empire brings out the geographic reasons for the distribution of tea and rice-growing. The next treatment is semi-historical, beginning with a brief statement of the earlier commercial relations and then taking up the present conditions. Japan's reliance upon the United States for certain commodities, notably cotton, illuminating oil and iron and steel, is shown to be mainly due to geographic conditions, while her exports to America, especially silk, tea, matting, bamboo and lacquered ware, are commodities which we are unable to produce. A trade thus based on geographic differences must be fairly enduring and mutually beneficial.

Foreigners in Japan, to the number of 11,684, are mostly classed as merchants and men of other professions. Of the Japanese in other lands 72 per cent., or 90,146, reside in the United States, and about 30,000 more are in Oriental lands, Korea, China, Russian and English colonies. Thus a very small per cent. of the Japanese with foreign residence are in Western countries other than the United States. Both the export and import business of Japan are conducted largely by resident foreigners. A good article, treating of the effects of Japan's commercial development on her civilization, and prepared by a Japanese student in America, will be read with interest. The monograph discusses the more important trades and industries as to their present condition and prospects. Elaborate statistical tables of actual conditions and comparative growth in production and commerce constitute at least one-third of the publication.—*Bull. Am. Geog Soc.*, January, 1905.

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TRANSPORTATION—PART IV[1]

BY J. T. HOLDSWORTH
Drexel Institute, Philadelphia, Pa.

COMBINATION PERIOD 1870-1898.

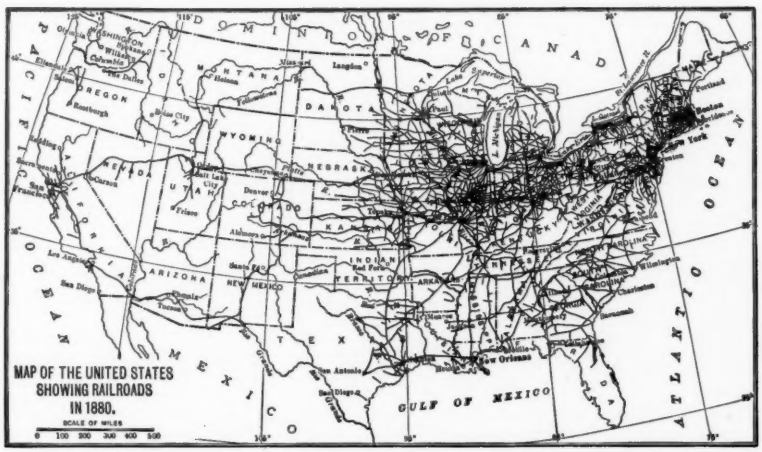
AFTER the Civil War the country enjoyed a long period of almost unbroken prosperity, marked by great economic changes, and especially by the unprecedented development of internal commerce and transportation. The vast reaches of agricultural and grazing lands of the Trans-Mississippi West were settled, and mining towns began to spring up along the great treasure-house of the continent, the Cordilleras. "Capitalists, confident of the growth of the country, and assisted by the generous aid of the United States and from the local governments and individuals of the section to be served, constructed railroads for the purpose of creating the traffic upon which the earnings of the road must depend. In many cases the railroads built during the twenty years following the Civil War were pioneers entering unsettled regions beyond the Mississippi and Missouri rivers, and opening highways by which immigration was able rapidly to occupy the prairies and mountain valleys of our great West."[2] The panic of 1873 was largely the result of this too hasty projection of railroads and their heavy over-capitalization. Yet by 1880 the lessons of '73 were forgotten and in the following decade 70,000 miles were added to the railway net. "Within ten years the people of the United States built as many miles of railroads as the people of the three leading countries of Europe had constructed in fifty years."

During this period of rapid growth, the railroads were pretty generally a law unto themselves in the construction and operation of their lines. Little or no control, regulation or supervision was imposed on them—the country clamored for railroads. "To such an extent was the public mind prepossessed in favor of railroads that any legislator who would have been instrumental in delaying the granting of a railway charter for the purpose of perfecting it, to protect the people against possible abuses, would have been denounced as a short-sighted stickler and obstructor of public improvements."[3] Under such circumstances it was but natural that abuses should spring up. Discriminations, rate wars, pooling, and other disturbing features developed in railroad management. In the new West, especially, the people were long-suffering, but in the years following the close of the Civil War, railway abuses became unbearable. In several of the grain

[1] Continued from Vol. III, p. 420. [2] Johnson, p. 28. [3] Larrabee, p. 125.

states, Illinois, Iowa, Wisconsin and Minnesota, granger legislatures passed laws seeking to regulate railroad rates and service. The railroad companies contested these "granger laws," but in 1877 the Supreme Court of the United States declared them constitutional, and the railways were compelled to submit to the regulation of the state.

Scarcely less serious abuses had arisen in the East. In 1874, there were five roads competing for the business between Chicago and the Atlantic ports—the Pennsylvania, the New York Central, the Erie, the Baltimore and Ohio, and the Grand Trunk. During the next two years violent rate wars ensued, through rates were cut to pieces on all the trunk lines, and



traffic was demoralized. The railroads soon found this cut-throat competition unwise, and after various attempts at agreement had failed, the device of the "pool"[2] was resorted to. Pooling is effected in various ways: (1) the traffic is divided among the various roads meeting at a common point—the traffic pool; (2) each road is allowed to carry all the freight it can get, then the total earnings of all the roads are divided according to agreed ratios—the money pool; (3) the territory is divided, each road being apportioned a section of country within which it enjoys exclusive control of the freight business. All three of these forms of pooling have been resorted to by American railway managers at some time or other. The end sought by the third form of pooling noted is gradually being brought about, without any formal agreement, through the grouping of our railroads into a few

[2] For Pools and Traffic Associations, see Johnson, ch. 16; also, Langstroth and Stilz, Railroad Coöperation.

great systems, each of which practically controls the traffic of a great region of the country.

The first regular pool of consequence in the United States was established in 1870 by the three roads connecting Chicago and Omaha—the Burlington, the Northwestern and the Rock Island. This pool, providing that each of the lines should have a third of the business, was so well organized that it lasted, with but one slight break in 1882, for fourteen years. Pooling agreements increased rapidly during the next ten years. In 1876, the Southwestern Railway Rate Association was formed to regulate competitive traffic between Chicago and St. Louis and points on the Missouri River. Similarly, the Northwestern Traffic Association controlled the traffic between Chicago and St. Louis on the east and Omaha and Council Bluffs on the west. West of the Missouri River various associations of a similar nature sprang up.

Many of these later organizations had activities other than the pooling of earnings or traffic. They "fixed the rates on joint and competitive business, laid down rules regarding the solicitation of traffic, took measures to prevent fraud, determined the speed at which the fast passenger trains should run, decided what kind of tickets should be issued, and what privileges should be afforded or denied shippers. Until 1887, a pooling agreement was a regular feature of the organization of all traffic associations; since then pooling has been illegal, but the traffic associations have continued to exercise their other functions."[1]

Though attempts had been made to secure agreements among the rival trunk lines, notably in the case of the Saratoga Conference in 1874, it was not until 1877 after three years of ruinous rate wars that the railroads concerned effected a coöperative organization. In that year, under the able guidance of Albert Fink, chairman of the Executive Committee of the Trunk Line Association, an agreement was reached by which the New York Central and the Erie were each given 33% of the west-bound traffic from New York, the Pennsylvania 25% and the Baltimore and Ohio 9%. Two years later Mr. Fink secured the establishment of the Joint Executive Committee, composed of representatives of the trunk lines which sought among other things to adjust the delicate problem of "differential"[2] rates between the various seaboard cities and the West. Most pooling agreements had attempted to control rates only between common shipping centers. But in the trunk line territory the rival roads terminated at different points—Boston, New York, Philadelphia, Baltimore. With the gradual diversion

[1] Johnson, p. 232.

[2] For good discussion of the problem of differentials, see "Trunk Line Traffic and Differential Rates," Monthly Summary of Commerce and Finance, Department Commerce and Labor, April, 1904.

of the traffic of the Erie Canal to the railroads the supremacy of New York was menaced by these other seaboard cities. The situation became still more complicated when Baltimore and Philadelphia demanded lower railway rates from the interior to equalize the difference in ocean rates to Liverpool. Naturally, each trunk road sought to build up the business of its seaboard terminus, and as has been noted, reckless rate wars followed. Finally the differences between the four important coast cities were adjusted by an agreement, April 5, 1877, which gave to Boston and New York the same rate from points West, to Philadelphia a rate slightly lower, and to Baltimore one still lower. These differential rates, or modifications of them, have obtained ever since, though the greatest dissatisfaction exists.

During the seventies and eighties, the tide of opposition to pooling and other supposed abuses steadily rose, and finally the demand for railway reform culminated in the enactment by Congress of the Interstate Commerce Act 1887. The most vital clauses of the statute are the following: Section one states the scope of the measure. It is to apply to common carriers engaged in transporting passengers or freight wholly or in part by rail under arrangement for a continuous carriage from one state to another or from the United States to any foreign country. This section states, also, that charges must be reasonable. Sections two and three prohibit personal and local discriminations. Section four, the famous "long and short haul clause," is an amplification of the two preceding sections, and especially prohibits that form of discrimination by which the charge is greater for a shorter than for a longer haul over the same line, in the same direction and under substantially similar circumstances and conditions. Provision is made for the suspension of this rule in special cases. Section five, "the anti-pooling clause," prohibits pooling of freight or earnings. The sixth section provides for publicity of rates. Section eleven creates the Interstate Commerce Commission to administer the law. The Commission consists of five members appointed by the President for a term of six years, not more than three to be chosen from the same political party.

The administration of the Act for nearly twenty years has revealed many weaknesses and defects in the statute. Decisions of the courts have shorn the Commission of much of its power, and since 1897 it has "possessed no effective power to adjust railway charges." Congress has remedied some of these defects by amendatory legislation. Under the terms of the original statute the penalties for violation of the law provided for in sections eight, nine and ten were applicable not to the corporation but only to the officer or agent guilty of the violation. The Elkins law of 1903 provides for the punishment of the corporation as well as its agents or officers.

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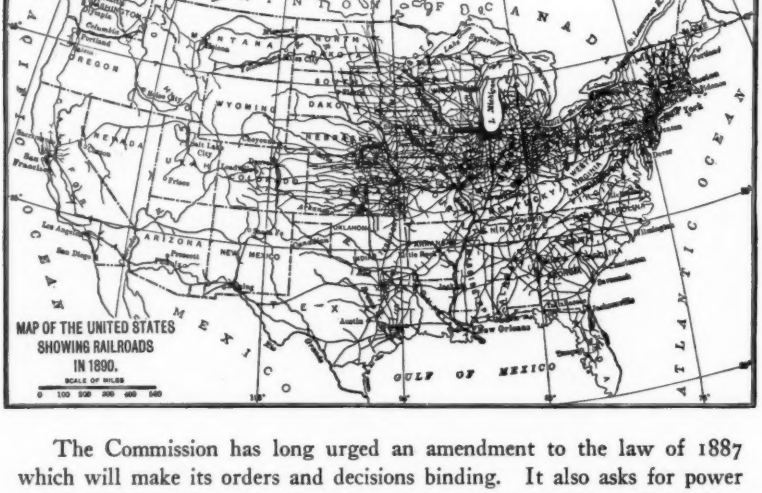
It also makes the acceptance of a rebate or discrimination a misdemeanor equally with the offer. Moreover, it revoked the imprisonment penalty and makes all misdemeanors punishable by fines ranging from $1,000 to $20,000.

The Commission is empowered to hold hearings, make investigations, order carriers violating the law to desist from their illegal practices, and award damages to be paid to the victims of these illegal acts. But the power of the Commission is greatly restricted because its orders do not have the binding effect of a court decree. If a carrier chooses to ignore the order of the Commission, obedience can be compelled only through an appeal to the United States Circuit Court.



The Commission has long urged an amendment to the law of 1887 which will make its orders and decisions binding. It also asks for power (1) to audit and inspect railroad accounts, in order to detect discriminations, (2) to decide what is a reasonable and lawful rate, and, finally, the Commission insists (3) that it should be the sole and final judge of the facts in any and all disputes between the public and the carrier.

The work accomplished by the Interstate Commerce Commission is summarized by Professor Johnson thus: "Although the ability of the Commission to accomplish its main purpose—the adjustment of rates and fares—has been greatly restricted by the narrow scope given by the Supreme Court to the act of 1887, the Commission has nevertheless brought about several important results: (1) Publicity of rates has been secured, and the public knowledge of railway affairs has been increased by the excellent statistics

collected and published; (2) the interstate commerce law has been of service in reducing the number of freight classifications of the country; (3) by its informal as well as its formal investigations the Commission has done much to bring about a better adjustment of railway charges, as between different localities, different commodities, and different shippers; (4) the work of the Commission has been of great educational value. Its reports have considered in a clear and comprehensive manner the important phases of the railway question as they have presented themselves year by year, and its decisions which now comprise over eight volumes, have developed a serviceable and valuable administrative code regarding railway regulations."

After pooling was prohibited by the Interstate Commission Act the railways fell back upon the traffic associations to regulate their competitive relations. Among the strongest of these associations were the Trunk Line Association in the East and the Trans-Missouri Freight Association in the West. In 1896 the Trunk Line and the Central Traffic Associations were united under the name of the Joint Traffic Association, whose Board of Managers composed of representatives of all the important systems involved, practically fixed the rates to be charged by the several railroads. In 1898, this association was declared illegal on the ground that in effect it violated the anti-pooling section of the Interstate Commerce Act, and also, that being a "combination in restraint of trade" it contravened the Sherman or Anti-Trust law of 1890. Similarly, the efficiency of the Trans-Missouri Freight Association as a regulator of the inter-railway relations was destroyed by an adverse decision[1] of the Supreme Court in 1897, which held that an agreement among competing railways to maintain rates, whether reasonable or otherwise, was a restraint of trade, and hence a violation of the anti-trust law.

These decisions left the railways with but little ground for lawful coöperative action. Thus hedged about with laws, whose framers apparently failed to discern that in the railway business coöperation is essential, the railroads since 1898 have been forced to resort to secret agreements to regulate their inter-relations. Through the traffic associations informal agreements are made as to rates and classifications. These are lived up to so effectually that the Interstate Commerce Commission in its annual report for 1901 declared that "the decision of the United States Supreme Court in the Trans-Missouri case and the Joint Traffic Association case has produced no practical effect upon the railway operations of the country. Such associations in fact exist now as they did before the decisions, and with the same general effect."

[1] Meyer, Railway Legislation in the United States.

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To effect uniformity in the classifications of freight so-called classification committees, representing the interests of the various railroads throughout the country, have sprung up. Since the enactment of the Interstate Commerce Act three great classifications have obtained, viz., the Southern, the largest, with seat at Atlanta; the Official, with offices in New York; and the Western, centering in Chicago. The latter exercises jurisdiction in the territory west of Chicago and the Mississippi; Official territory lies east of the Mississippi and Chicago, and north of the Potomac and Ohio rivers; the Southern classification obtains in the territory south of the Ohio and east of the Mississippi. Each of these groups is in charge of a Classification Committee, which is entrusted by the railways of the different sections with the work of classifying the freight into first, second, or sixth class, etc. At present there are about 9,000 articles included in these classifications. Many commodities, however, are still carried at special or commodity rates, and though efforts have been made to bring them all under one general freight classification such a consummation seems impracticable at the present time.

(To be continued.)

PRINCIPAL ERRORS COMMITTED IN THE TEACHING OF ELEMENTARY GEOGRAPHY AND THE NATURAL SCIENCES

1. *Verbosity.* Basing the instruction on oral descriptions rather than in the direct observation of nature.

2. *Inflexibility.* Disregarding the free expansion of the mental activity of the child, the instructor aiming to make the pupils think and speak as he himself does. This weakens the confidence of the children in their own powers and is injurious to the formation of character.

3. *Vagueness.* Asking questions the replies to which may be found by chance. This necessitates the making of ridiculous statements or blunders, vitiates the reasoning power and tends to the loss of time—presenting lessons without plan.

4. *Impatience.* Preventing the children, especially the backward and slow, from reflecting calmly.

5. *Childishness.* Presenting unnecessary and foolish examples and comparisons, prejudicial to the exactitude of ideas (fidelity).

Observation: All the errors noted above are committed in teaching the various subjects of the curriculum, but they are more frequent and attended with greater danger in treating the natural sciences.—*Anales de Instruccion Primaria, Montevideo, Uraguay.*

EDITORIALS

CURRENT EVENTS

BEGINNING with the March number the JOURNAL will regularly contain a department devoted to Current Events in Geography. This department will be under the direction of Superintendent W. W. Rupert of Pottstown, Pa., who for several years published with great success a series of geographical leaflets devoted to current events in geography. The aim of the department will be to present those more recent changes in the geography of the world that will be of help to teachers in making their class-room work interesting and practical.

THE ASSOCIATION OF AMERICAN GEOGRAPHERS

The announcement in our column of News Items of the recent formation of the Association of American Geographers is of more than passing interest to workers in educational geography. Though the new association is small and is entirely composed of the men and women known for their work in scientific geography, the association will not devote itself entirely to the advancement of research in geography.

The names of the president and secretary-treasurer—both with a wide and enviable reputation for their contributions to educational geography—are a guarantee that the promotion of this important phase of applied geography will not be neglected.

The association will take up many problems in the near future and will actively begin work to make scientific geography more accessible to teachers and to help teachers of all grades to become better geography teachers.

The plans that have been proposed to bring about this much to be desired end, are as yet tentative only, but will be announced as soon as sufficient progress has been made to warrant publicity.

THE NEED OF LOCAL GEOGRAPHIC SOCIETIES

The formation of a national scientific society of geographers, like the Association of American Geographers, cannot be of the greatest effect unless accompanied by increased interest in geography in local centers. The local geographical societies of the country, composed of scientists and laymen, are already numerous. Each local society acts as a center of geographic interest and work; helps efficiently in the development of public opinion in reference to geography and in spreading geographic knowledge. The more local societies the better for the cause of geography in the country, whether these societies be composed of geographers, of people interested in geography in a

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general way or of teachers. Clubs of teachers may be most effective local geographic societies as has already been proved in several places in this country.

The formation of the new Geographical Society of Minnesota is a step in the right direction and we trust other similar societies may be organized in the near future in the several large cities of the country in which the workers in geography are not as yet banded for mutual assistance.

PHYSICAL GEOGRAPHY FOR HIGH SCHOOLS

Several years ago the College Entrance Examination Board prepared and published an outline for a course in physical geography for fourth year high school pupils, which might be used as a basis for the examinations given by the board and which would be accepted for college entrance by several of the eastern colleges making use of the board's examinations. Though this course was primarily for college entrance, it was intended to be a course of value also for secondary school pupils who did not intend to go to college. As a result of this action, many of the secondary schools, especially in New York state, placed their physical geography in the fourth year and included in it a goodly proportion of laboratory work.

In 1901 a committee of the New York State Science Teachers' Association, published in the Proceedings of the Association an inclusive report outlining a course in physical geography for fourth year high school pupils and showing how the same course, in an abridged form, could be applied in the earlier years of the course.

This year a committee of the Academic Principals of New York has reported to the Regents of the University of the State of New York, a course of study based on the report mentioned above, and has recommended that physical geography be included in the last year of the high schools in New York State. If this report is adopted it will mean that the approved course of study in physical geography for the secondary schools of New York state will prepare for college entrance and will strongly emphasize laboratory work.

At its meeting during the last week in December, the New York State Science Teachers' Association formally recommended to the Regents that physical geography be made a fourth year high school subject.

If these several recommendations are adopted by the Regents, geography teaching in the secondary schools of New York state will have made a great advance—far greater than has been made in all the last twelve years since the first exploitation of modern physical geography in the epoch opening report of the Committee of Ten.

REVIEW

STUDENTS' LABORATORY MANUAL OF PHYSICAL GEOGRAPHY[1]

THE laboratory exercises in Brigham's manual cover the field presented in Gilbert and Brigham's "Introduction to Physical Geography" and furnish a helpful supplement to the volume.

While laboratory manuals of physical geography are becoming almost numerous, few, if any, are as comprehensive in scope as the volume under discussion. Each department of the subject receives due consideration though if this attention were more impartially bestowed the result might be better. Eighty-four pages are devoted to problems on the lands, thirty-six pages to those of the atmosphere, fourteen to the earth as a globe, seven to the ocean and four to life distribution.

There seems to be an over emphasis of the lands, and too little attention to the earth as a globe and to the ocean where, in each case, many topics valuable from the laboratory standpoint have been omitted. The work on the lands is detailed in the extreme and being based on type forms drawn principally from our own country should certainly result in an understanding not only of the physical geography of the land but in a renewal of knowledge of the United States as well, gained and perhaps forgotten in earlier years.

The questions proposed are generally strong. Most of them stand the test of good questioning, arousing thought and inciting to investigation. A few are disappointing, suggesting too much and thus defeating the purpose of laboratory work. The following, selected from a field exercise on weathering serve as illustrations of the latter point: "Has it (marble) lost its polish in whole or in part? Do any seams appear? Have the corners scaled anywhere? Is the top surface roughened and pitted by the solvent work of rain water?" etc.

The emphasis upon library work is somewhat disproportionate for a laboratory course, though it is probably true that many schools are more ready to do good work in the library than in the laboratory. There is danger in permitting pupils to go to the text-book or to the encyclopedia for information and accepting the results as "laboratory work." This work is certainly valuable but it is not independent investigation and while it should have a place in a course in physiography it should not be possible to

[1] Students' Laboratory Manual of Physical Geography. By Albert P. Brigham. Pp. 153. New York: D. Appleton & Co., 1905.

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substitute it for laboratory work if laboratory work can in any way be introduced.

There are occasional maps and illustrations in the manual upon which exercises are based though the attempt has not been made to embody in the volume all the materials of this nature required for the work. An excellent list of topographic maps—all of those mentioned in the text—is included in the appendix.

While laboratory workers in physical geography will scarcely adopt the manual in its entirety there are a sufficient number of exercises, approximately one hundred and thirty, to allow a sifting of problems and a selection of those best adapted to the development of the pupil and to that of the subject under discussion. The book is as a whole very suggestive and is probably the best in the field though it lacks strong quantitative exercises in several departments. C. B. K.

RECENT PUBLICATIONS

EXCURSIONS AND LESSONS IN HOME GEOGRAPHY. By C. A. McMurry, pp. ix + 152. New York, The Macmillan Company, 1904.

A series of suggestions as to excursions for beginning pupils, showing how excursions have been conducted in different places to study local scenery, shops and factories, commerce, agriculture and government. Extremely detailed and full of information for a teacher. Many of the topics included are not strictly geographical and in several cases the minutiae are over-emphasized. Well illustrated and helpful, especially to those who believe in teaching technical details in industrial geography.

TYPE STUDIES FROM UNITED STATES GEOGRAPHY. By C. A. McMurry, pp. vi + 288. New York, The Macmillan Company, 1904.

An amplication of the author's well known series of suggestions as to teaching the United States by types—that is, by emphasizing one locality as a basis for comparing other similar localities with it. Well illustrated and good for supplementary reading, but alas! is minus an index.

PHYSIOGRAPHY—AN INTRODUCTION TO THE STUDY OF NATURE. By T. H. Huxley. Revised and partly rewritten by R. A. Gregory, pp. xi + 423. New York, The Macmillan Company, 1904.

A modernized edition of Huxley's classic Physiography, in which the clear exposition and attractive style of the author are retained. Well illustrated and extremely interesting. Should be read by every teacher of physical geography.

HOW WE ARE CLOTHED—A GEOGRAPHICAL READER. By James F. Chamberlain, pp. viii + 235. New York, The Macmillan Company, 1904.

A companion volume to the author's How We Are Fed, and extremely helpful for supplementary work in the earlier grades. Brief accounts of the characteristic dress of different peoples, followed by accounts of how different textiles and goods are produced. Style somewhat choppy and descriptions often interrupted by thought disturbing questions. Hence the book does not always read smoothly for the child. Illustrations pertinent and effective.

NEWS ITEMS

ASSOCIATION OF AMERICAN GEOGRAPHERS.—On December 29, 1904, an Association of American Geographers was formed in Philadelphia, membership in which is limited to persons who have done original work in some branch of geography. According to the constitution the "object shall be the cultivation of the scientific study of geography in all its branches, especially by promoting acquaintance, intercourse and discussion among its members, by encouraging and aiding geographical exploration and research, by assisting the publication of geographical essays, by developing better conditions for the study of geography in schools, colleges, and universities, and by coöperating with other societies in the development of an intelligent interest in geography among the people of North America."

The officers for 1905 are:

President—Professor W. M. Davis, Harvard University.

Vice-Presidents—Mr. G. K. Gilbert, U. S. Geological Survey; Mr. Angelo Heilprin, Philadelphia Academy of Sciences.

Secretary-Treasurer—Professor A. P. Brigham, Colgate University, Hamilton, N. Y.

Councillors—Professor R. S. Tarr, Cornell University, Ithaca, N. Y.; Mr. H. C. Cowles, University of Chicago; Mr. Cyrus C. Adams, American Geographical Society, New York City.

THE GEOGRAPHICAL SOCIETY OF MINNESOTA.—A new geographical society has recently been formed in Minnesota and held its first meeting at Minneapolis on December 27. The president is Professor C. W. Hall of the University of Minnesota. The secretary-treasurer is Mr. Charles E. Flitner of the U. S. Grant School, St. Paul.

GEOGRAPHICAL ACTIVITY AMONG THE TEACHERS OF TRENTON, N. J.—Superintendent Mackie of Trenton, N. J., recently sent out a circular letter to the teachers of the city asking their opinions as to the desirability of forming a class for the study of geography during the present winter. The teachers met and voted to form such a class and asked Supervisor R. H. Whitbeck of the State Model School to take charge of the class. The outline of work for the winter includes fifteen lectures, supplemented by assigned readings and the preparation of two papers by each of the teachers. Field trips will be taken in the spring. Over one hundred teachers are enrolled in the class and the studies are being carried on with genuine enthusiasm.

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NOTES

GEOGRAPHY AT COUNCIL BLUFFS, IOWA[1].—Iowa has fewer acres of untillable land than any other State in the Union, and, in consequence, its population is scattered on farms and in small cities. Its educational policy is too nearly indicated by the headlines in a recent Iowa newspaper: "Fads not popular. County superintendent to stick to old lines."

But at Council Bluffs, Mr. W. K. Clifford, first as the principal of the high school, then as superintendent of the city schools, has been proving for six years that the old lines may not be best, that the old highway of the three r's can be improved. The result is, that Council Bluffs children read better, write better, and know more about arithmetic than the children elsewhere trained under older methods.

"I used to think," said Mr. Clifford, "that, if I ever came to have charge of schools, I would not teach some things as I had been taught." Thus, for one thing, he introduced the novelty of teaching the children to read, to write and to cipher in teaching them geography.

At the beginning of his work, he found the children still sing-songing lists, "Alabama produces—" "Louisiana produces—" He sent out at one time in many directions, more than a hundred letters asking, "Can you give me, lend me, or sell me material illustrating your part of the country?" The people who got the letter replied. Much has grown from that beginning. No teacher in geography in Council Bluffs is now "asking questions from books." They do not have the traditional book.

In a grammar school class there that I visited, the subject of the lesson was China. The children had read something about Chinese history and Chinese customs in a geographical reader, the text and pictures of which had aroused their interest. Now they were studying about silk manufacture, learning about a product in Superintendent Clifford's new way. On the teacher's desk was an array of bottles and cases, with samples of silk mounted on cardboard. All about the class room, ranged along the board or in the children's hands, were pictures representing the silk industry.

While the rest of the class told or wrote the history of the silk from moth and egg to taffeta or brocade, a little girl showed me parts of the exhibit. "See," she said, with modest enthusiasm, "how neatly the worm eats out the place in the leaf."

Among the things she showed me were pictures of Corticelli silkworms, a worm eating, a worm full grown, and a worm ready to form the cocoon; a set of illustrations of silk manufacture showing the cocoon from the first

[1] Reprinted by permission from the World's Work, July, 1904.

spidery floss on the tree to the final stage with the worm out of sight; and illustrations of silk manufacture. There were samples in bottles of the wild silk from the wild silk worm, of raw silk, of silk in its various manufactured stages. About each of these things, the children could talk and write.

In a box by itself was the printed matter, furnished to the teacher for the lesson. It included a list of references to the best text-books, material culled from some of them, a mass of printed matter prepared by the Philadelphia Commercial Museum, an article on silk, two pamphlets issued by a silk company, a chapter from "Stories of Industry," and a topical outline of the whole subject for use in the class room. "In this sort of thing," said Mr. Clifford, "a supervisor could work his teachers too hard. I do not expect them to go to the library and work themselves to death at night."

The superintendent himself provides the material for lessons like this. It is gathered from many sources. From the printed illustrations and from photographs, the science instructor in the high school, Mr. Thomas, prepares the lantern slides. Much of the material like the silk cabinet, showing the stages of the manufacture, is bought as it is used; some of it is made up to order; and much is given. Cocoa manufacturers have sent generous exhibits. One not only put up a complete set of pictures and bottles, but expresses the whole, free, to any school that wants it. A coffee house has furnished a similar complete coffee exhibit. Photographs of cocoa trees, and coffee plantations, sent in this manner, show to the children the actual employees who have gathered the cocoa and the coffee that are in the bottles. Nothing from any source likely to stimulate the child's interest is overlooked.

The materials are first packed in the superintendent's office, into light cloth-bound boxes. They then circulate from one school building to another. While one division of the grade studies silk, another, also working on China, is busy with tea. When each has finished, exhibits are exchanged. Each teacher, too, with the assistance of her class, voluntarily collects additions to the material furnished; and these remain a stationary "exhibit" in her own class room.

The stereopticon is also used in elementary grades to reinforce not only geography but every subject. Nearly every school in the city has a lantern —bought with money raised at school entertainments. At these entertainments the children's work is shown to the parents. "When we began," a principal said to me, "People that lived under the shadow of the school and never saw what was going on, came and saw. We charged everybody, adults and children alike, ten cents. When the first exhibition was over we had a hundred dollars. With fifty dollars we bought a lantern, and fifty dollars remained in the treasury."

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The crowning lesson on an industry is the lantern lecture. At one which I attended, the occasional "Oh! Oh!" or "Ah-h!" that greeted a picture was very expressive. The children of one class described in turn, the things going on in the pictures of lumber camps, of sugar factories, of cotton gins; and forty listening class mates were ready to correct mistakes or to supply omissions. All the classes write accounts of the pictures, describing one or many. Here enters Mr. Clifford's combination of many studies in one. The work may be called geography, penmanship or composition.

I had a stenographer record one review lesson. Here are scraps of oral work from sixth grade childrens' story of wheat. The scraps are uncorrected from different parts of the recitation:

Girl—The origin of wheat is not known, but most botanists think it is in the western Asia near the Mediterranean Sea. The Chinese are known to have cultivated wheat two thousand seven hundred years before Christ, and the Egyptians before them. A grain of wheat was found in one of the pyramids of Egypt. In Egypt the goddess is called Isis and in Greece this goddess is called Ceres. In Egypt when the Nile River overflows, the wheat is scattered over the water and sinks into the earth. The wheat spreads and before the Nile River overflows again the next year the wheat is ready to harvest.

Teacher—Anything she forgot?

Girl—From the goddess of Greece called Ceres, we get the word cereal, which means grain.

Boy—The winter wheat has a much stronger stalk than the spring, and the kernel is larger.

Girl—The wheat stalk is from three to five inches long.

Boy—The winter wheat has a much larger stalk, but it is brittle and the spring wheat has a stronger stalk but it is tough and does not break so easily.

Boy—Every large mill has a man to bake the flour into little cakes to see if the flour is all right in baking.

Girl—There is a chemist, too.

Boy—He tests the flour to see how much gluten there is in it, and see how much it is worth.

Before every child in Council Bluffs finishes the eight elementary grades he has studied in his geography course, by means of "exhibits" and lantern lectures, thirty productions or sets of productions: Cotton, flax, Manila hemp, Sisal hemp, ramie, wool, silk, wheat, corn, rice, cocoanut, coffee, tea, cocoa, sugar (cane, beet and maple), honey, woods, cork, packing-house products, buttons, rubber, petroleum, copper, sponges, zinc, coal, asbestos, Alaskan products, Philippine products and Hawaiian products. Every

month this list grows. And the children's power of expression, both oral and written, grows visibly as they advance from grade to grade, learning from objects and from pictures.

From the time when the pupils in the first grade tell the story of Cinderella from pictures on the screen, till upper classes are ready for college, the lantern is in constant use. Alps, or Indians, Mexico or the Pied Piper, every subject has its turn. The same set of slides clears up the allusions in a poem, furnishes composition themes, and reinforces history. Colored lantern pictures of the Yellowstone, of the Kremlin, of a street in Constantinople, tell and suggest far more than the prints of the geography text. By the lantern work the dull are stimulated.

The Council Bluffs child who has seen mats woven from a certain straw in India, the rope twisted from it in China, the thatch furnished by it for a house in the Philippines, is finding out the world he lives in. He may also establish actual relations with distant parts of it. For example, former Council Bluffs teachers now in the Philippines write to the pupils and send them little museums of native objects—banana fibre and the soft cloth woven from it, pottery models of native stoves, betel nuts, soap-bark used for washing the hair, a doll dressed to represent a native lady, silky cotton from the cotton tree to be compared with the coarser product of our shrub. "All these things have an extraordinary fascination for the children," said one of the teachers. "They like to read about them, talk about them, write about them, spell their names and draw them." I have even found that these children were exchanging letters with public school children in Seattle, in Los Angeles, and in Jacksonville, Florida, about subjects in which they had become interested.

All this gives a zest to the school work. There is interest in a letter that is going somewhere, a charm in the arithmetic of a tea invoice if you "know all about tea," a certain thrill in words like palm and bayou, ice-floe and jungle, if you know what they stand for. Vitality in one school subject vitalizes all the subjects.

"This is all very well," says the carper, "but do these children know capitals and rivers? Can they bound Arizona?" They do. They can.

They learn these things in many ways. Every school room from the kindergarten up, is equipped with a sand table. When a section of the earth is to be studied, groups of children build up a relief map of that section, comparing it carefully with a model on the wall. In an individual sand pan at his desk each child constructs another map. One little class, advanced beyond the study of their school-yard, their city, and Pottawattamie county—for these parts of the earth are always studied first—had reached the point

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where all Iowa was their province. A dozen of them were gathered around the big sand table. When I entered the room, the sand map of Iowa was complete in outline and was provided with the indentations for rivers.

"Put in the cities, Thelma," said the teacher.

Thelma gathered up from the boards behind her a handful of chalk bits, and set them briskly in place, interrupted by others the instant a white spot lost its bearings. "Clinton is farther south." "Isn't Burlington a little more west?" "You've forgotten Sioux City."

Two of the boys with tiny twigs "planted trees" along the rivers.

"Farther apart because there are no forests," admonished the teacher.

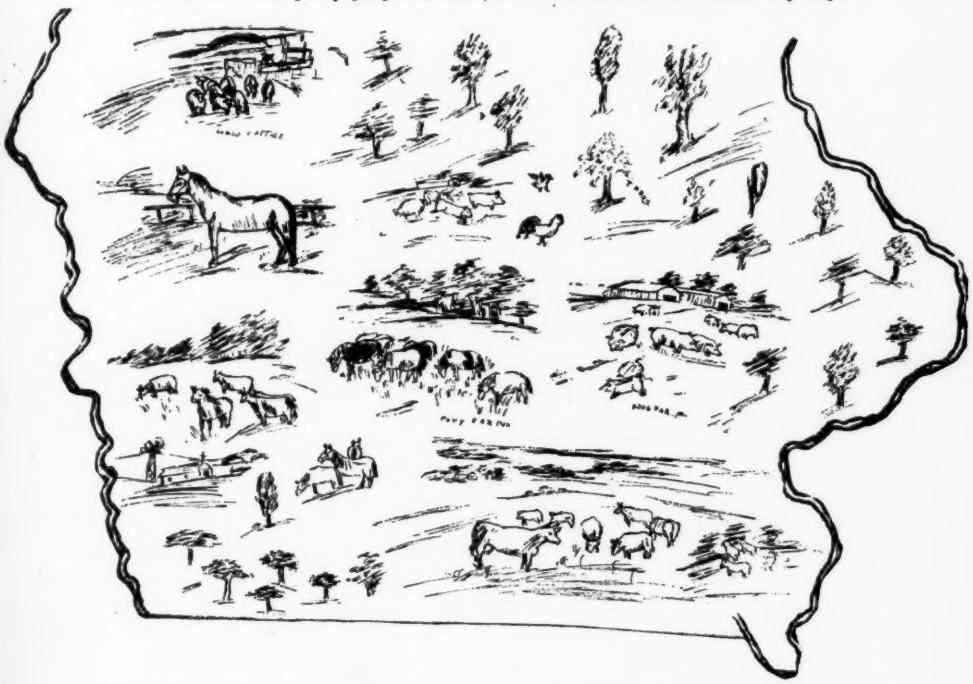
Many hands dived into a box and set coal, lead, stone, wherever there were mines or quarries. Several stretched different colored strings from one chalk city to another to represent the railroads they named as they settled the twine. Corn and oats were picked out and strewn broadcast, to show the districts where corn and oats are grown, and paper pigs and animal crackers were dispersed to indicate the portions of the state where hogs and other domestic animals are raised.

Salt-and-flour maps that, completed, look like plaster casts, are modeled for every section of the earth studied. Elevations, depressions, outline, are painstakingly molded. After the maps are dried, rivers are drawn in black ink. The supporting pasteboard is tinted to suggest the water of the oceans most of these children have never seen. For every geographical section too, every child makes a "book" of free hand paper maps. A common set holds seven—the political divisions (colored); rivers and capitals in black and white; elevations variously indicated; animals sketched in ink—a hog rampant forefeet in a trough, sheep very meek, cows of towering and pointed horns; vegetable productions, represented by pears, cranberries, a sheaf of wheat, apples on a twig, maple sugar trees tapped for sugar; characteristic industries, indicated by a shoe, a watch, a factory with an amazing wealth of chimney, cars carrying coal, or lumber floating in a river; railroads, generally done in colored lines.

Sometimes the map shows the wild animals only, and looks like those our learned ancestors of the eighteenth century adorned with "lyons and other beasts of prey." One picture I saw—a large cod swimming into Cape Cod Bay—suggested the whales in early prints in Boston. Sometimes the vegetable map is decorated with fruit and flowers done in color. The ingenuity to be found in any dozen of the little map "books" is startling. The result of this method of training is that these children can "bound" anything, because they know, not because they remember.

How the Teachers Study.—To give the children a definite idea of

certain industries, teachers take them to visit neighboring shops and factories. To give the teachers a closer knowledge of what they teach, Superintendent Clifford makes journeys to outside places. The initial trip, Christmas, 1902, was to New Orleans. Fifteen teachers with Mr. Clifford and his family chartered a tourist car. The cost of travel for each person was little more than the ordinary fare for a berth. The car had a stove in it. The party prepared food, and milk and cream which they kept



cool by putting them on the platform. Roast potatoes, breakfast foods, hot soups, waffles and syrup were part of the menu. A stop at St. Louis gave them a glimpse of that city. At New Orleans, they found luxurious quarters in an old mansion for seven, eight and ten dollars a week, took two meals a day at an excellent restaurant for fifty cents a meal, had a late salad supper at their rooms. They visited the sugar and cotton plantations, the oyster bay and cannery at Biloxi, Mississippi, the sugar factories and the shipping docks. The women went to the French opera; the men were entertained by the clubs, and met there prominent Southerners, whose ac-

quaintance was a delight. The trip took two weeks, cost very little and added immeasureably to the usefulness of every one who went. Mr. Thomas took seventy-five pictures, and, on his return, converted them into lantern slides. The teachers who went on the trip always show these pictures to the children that are studying the Southern States.

I heard one of these teachers give a New Orleans talk to the class. It did not contain a wasted word. Every picture had a distinct value. The levees of the Mississippi, the stately plantation homes, the bayous, cotton-fields, negro cabins, negro school-rooms, the French city, the rice fields—all these things were full of interest, because the teacher had studied her subject at first hand, and was able to mingle illuminating anecdotes with facts.

But facts are not all the children gain from such talks. They learn also to sympathize with conditions that are strange to them. The teacher's story of the generosity and hospitality of the New Orleans school superintendents, "real southern hospitality," awoke a lively interest; her description of the statue of Robert E. Lee, "a brave man, loved by all broad-minded people," evoked a spirit worth even more than "information."

Indeed, the results of the trip to New Orleans have been such that Mr. Clifford plans to secure trips to Mexico and to Cuba. Nothing is wanted but money. Many teachers cannot afford to educate themselves in this manner. If the city will, either by direct appropriation or by raising salaries, make possible many such expeditions, not ten per cent., but ninety per cent. of the teaching corps will be able to pass on to Council Bluffs children what they themselves have gained from travel.

WIND BAROMETER INDICATIONS.—When the wind sets in from points between south and southeast and the barometer falls steadily a storm is approaching from the west or northwest, and its center will pass near or north of the observer within twelve to twenty-four hours with wind shifting to northwest by way of southwest and west. When the wind sets in from points between east and northeast and the barometer falls steadily a storm is approaching from the south or southwest, and its center will pass near or to the south or east of the observer within twelve to twenty-four hours with wind shifting to northwest by way of north. The rapidity of the storm's approach and its intensity will be indicated by the rate and the amount of the fall in the barometer.—*Daily Weather Map.*

SCHOOL GEOGRAPHY BY CORRESPONDENCE.—Miss Anna J. Stone, Principal of the Jarvis Street School, Binghamton, N. Y., would like to exchange letters by grades with some school at a distance, and can arrange for such an exchange in all of the eight grades.

OUTLINE OF COURSE IN GEOGRAPHY FOR STATE OF MICHIGAN.—General Considerations. I. The aim in all geography teaching should be to elicit ideas, not to teach words; to secure the understanding of geographical facts and the building of mental images of distant places, peoples and conditions, not to have statements about them memorized. The ideal in this teaching is to seek the facts of geography in the world of out of doors when we can get at them there, in photographs and maps that symbolize this world, and in the text-book, which is perhaps the least vivid of these sources.

II. Class work in geography should appeal to both reason and memory; reason first and memory last. Children should be led to build images from out of doors observations, from the study of maps and photographs, from these to reason out and image distant geographical facts, and lastly to memorize them. When the stage of memorization is reached, there should be no half-hearted work; facts should be driven home to stay.

III. The committee recommends a first study of the main physical features of each continent with a brief treatment of prominent physical regions, closing perhaps with the middle of the fifth grade, and then a thorough intensive study of the few important countries of the world up to the end of the seventh grade. To supply a basis for comparison in the study of foreign countries and in view of the fact that many children leave school early, it is recommended that the United States be studied twice, first at the end of the regional study and again in more detail at the end of the course.

IV. The following is the order of study recommended:

1. Home geography, below the fourth grade and preceding the use of any text-book.

2. The earth as a whole. Important material is the cheap globe, one to every few pupils.

3. Prominent physical features of each continent, with brief study of regional geography.

Note. So much (1, 2 and 3) may perhaps be accomplished by the middle of the fifth grade.

4. The few important countries studied intensively, a few others briefly, touched from the standpoint of their main interest for the rest of the world, which may well be at times the course of current events.

V. The thorough study of a country regarded as important should bring the children vivid ideas of what that country is and stands for in the world's progress, ethically, socially, industrially and commercially; what are her landscapes, her people, her cities and villages; how she lives, what her

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institutions, and the influence they have had on the world's work, and especially their influence upon and relation to the progress of our own country. If the location of fewer cities, mountains and rivers should be taught than has been usual, they should be taught very thoroughly.

A few countries—and these the countries of most importance—made real in landscape and institutions—this is the committee's ideal of geographic attainments in the grades.

The following schedule suggests how such a plan of study could be fitted into the allotted time. The committee thinks of such time for such countries rather than just this time for just these countries:

Grade III. Observational or home geography, throughout the year.

Grade IV. The world as a whole, 6 weeks; regional study of North America, 10 weeks; regional study of Europe, 10 weeks; regional study of Asia, 6 weeks; regional study of South America, 4 weeks.

Grade V. Fuller study of United States and Michigan, 10 weeks; regional study of Africa, 4 weeks; regional study of Australia, 4 weeks; intensive study of Great Britain, 10 weeks; intensive study of Germany, 8 weeks.

Grade VI. Intensive study of France, 8 weeks; intensive study of Russia, 6 weeks; intensive study of Japan, 6 weeks; intensive study of China, 4 weeks; intensive study of India, 4 weeks; intensive study of Brazil, 3 weeks; intensive study of Chile, 3 weeks; additional, 2 weeks.

Grave VII. Intensive study of Argentine Republic, 3 weeks; intensive study of other countries, 15 weeks; intensive study of United States, 18 weeks.—From 14-page Report on Course of Study in Geography, published in *Normal College News,* November, 1904.

MAP STUDYING.—It is as futile to attempt to study geography without maps as it would be to attempt to study chemistry without handling any of the substances treated of in that science. The study of maps is an absolutely essential factor in the study of Geography; for a map is the ultimate record of all geographical work. The difficulty of the geography teacher lies in leading his pupils to use the maps properly; in other words to make the map the means of developing the thought power. To attain this end, it is essential that the pupils in the lower classes should have been taught to take a bird's eye view of the town or the village in which they live and draw a sketch map representing its main surface features. They must be told to associate with it some definite measure, such measurement as shall constitute a scale. It is only when they have received such training, that they will be able to realize that the lines upon a map represent the physical

features of the earth as actually observed and drawn to scale. A map in general use in our schools at the very first sight presents an immense variety of information to enable the student to see for himself the size, the outline of a country, the relief of its surface, the character of the coast, the courses and navigability of rivers, the size and position of towns, the administrative divisions, the roads, canals and railways. But all this is too much for a pupil even of the high school. The effect of such a map on the young student is repellent. To make the teaching more effective and less confusing it is better to have different maps to deal with different points. Considerations of cost will stand in the way of 99 per cent. of our schools in the matter of the purchase of these maps. But I believe no school can get on without a copy of a good atlas of the sort of the Twentieth Century Atlas. With the help of the maps in this atlas, the teacher ought to draw outline maps on the blackboard and insert in this map only such information as the prescribed lesson of the hour necessitates. This will enable the students to study the individual points with great clearness. The teachers will be at liberty to make these maps as simple in character as he wants them to be. He can tell them the meaning of the symbols he employs: for map-reading as after all only the interpretation of symbols.—*Indian Journal of Education,* September, 1904.

CURRENT ARTICLES ON COMMERCE AND INDUSTRY.—*December:*—

British India, The Future of, *World's Work.*

China, *Nat'l. Geog. Mag.*

Chinese Business Methods in San Francisco, *Bookkeeper.*

Clothing Manufacture: The Rise of the Tailors (Ill.), *McClure's Mag.*

Coffee: Notes Upon Its Introduction and Cultivation in Costa Rica, *Bull. of Bureau of Am. Republics,* Nov.

Education: Successful Careers of College Graduates, *Sat. Evening Post,* December 3.

Education: The Value of Employees, *System.*

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